

WE CLAIM:

1. A metallurgical interconnection for electronic devices,  
comprising:
  - 5           a first interconnection metal having contact area  
            and surface affinity to forming metallurgical  
            contacts; and
  - a second interconnection metal capable of  
            reflowing;
- 10           wherein said first metal is shaped to maximize said  
            contact area, consequently to increase the  
            interconnection strength, and to stop nascent  
            cracks propagating in said interconnection.
2. The interconnection according to Claim 1 wherein said  
15   first metal shape comprises castellations and  
      corrugations.
3. The interconnection according to Claim 2 wherein said  
      castellation and corrugation is created by stamping or  
      etching.
- 20   4. The interconnection according to Claim 1 further  
      comprising predetermined contours of said first metal,  
      which are arranged in concentric, parallel, or  
      repetitive patterns.
- 25   5. The interconnection according to Claim 2 wherein said  
      castellation and corrugation are creating grooves  
      suitable for venting air during the reflow process by  
      which said interconnection is created.
- 30   6. The interconnection according to Claim 1 wherein said  
      first metal shape comprises protrusions creating wall-  
      like obstacles in the interconnection zones of highest  
      thermomechanical stress, whereby propagating cracks are  
      stopped.

7. The interconnection according to Claim 1 wherein said first interconnection metal is a copper layer having a thickness between 10 and 30  $\mu\text{m}$ .
8. The interconnection according to Claim 6 wherein said contact area is enlarged at least by a factor of two compared to the area of flat surface geometry.
9. The interconnection according to Claim 1 wherein said first interconnection metal is a copper layer having a thickness between 0.8 and 5  $\mu\text{m}$ .
10. The interconnection according to Claim 9 wherein said contact area is enlarged at least 25 % compared to the area of flat surface geometry.
11. The interconnection according to Claim 1 wherein said surface affinity for metallurgical contacts is provided by a flash of gold, nickel/gold, or nickel/palladium.
12. The interconnection according to Claim 1 wherein said second interconnection metal is selected from a group consisting of tin, tin alloys including tin/indium, tin/silver, tin/bismuth, tin/lead, three-phase alloys, conductive adhesives, and z-axis conductive materials.
13. The interconnection according to Claim 1 wherein said mechanical interconnection strength is created by uniform solder wetting.
14. The interconnection according to Claim 1 wherein said nascent cracks are cracks in the second interconnection metal after reflow, originating at the surface and propagating deeper into and across said reflowed metal.